

R13

Code No: 114CV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February -2024

**ELECTRONIC CIRCUIT ANALYSIS
(Electronics and Communication Engineering)**

Time: 3 hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) Draw the simplified h- parameter model of CE amplifier. [2]
- b) State and derive equivalent input, output impedance of Miller's theorem [3]
- c) What is the role of bypass capacitor in BJT CE-amplifier circuit? [2]
- d) Discuss about the Gain bandwidth product. [3]
- e) State Barkhausen criteria for oscillation. [2]
- f) Compare positive feedback and negative feedback. [3]
- g) State the advantages of push-pull configuration. [2]
- h) Discuss about series fed class A power amplifier? [3]
- i) What is use of transformer in tuned amplifier circuit? [2]
- j) What is Heat-sink? Classify the different types of Heat sinks. [3]

PART - B

(50 Marks)

- 2.a) Derive the expression for current gain, input resistance, voltage gain and output resistance of CB amplifier using simplified h parameter model.
- b) In a single stage CE amplifier $R_S=1\text{ K}\Omega$, $R_1=50\text{ K}\Omega$, $R_2=2\text{ K}\Omega$, $R_C=1\text{ K}\Omega$, $R_L=1.2\text{ K}\Omega$, $h_{fe}=50$ and $h_{ie}=1.1\text{ K}\Omega$. Find A_I , R_i , R_o and A_v . [6+4]

OR

- 3.a) Derive the expressions for higher and lower cut-off frequency of a multistage amplifier.
 - b) Derive expressions for overall voltage gain and overall current gain of a two stage RC coupled amplifier. [5+5]
- 4.a) Derive the expression for the CE short circuit current gain at high frequencies.
 - b) Derive the voltage gain equation for emitter follower amplifier at high frequencies. [5+5]

OR

- 5.a) Derive the expressions for hybrid pi conductance of CE transistor at high frequencies.
 - b) Explain the small signal model of MOS transistor? [5+5]
- 6.a) Explain the principle of negative feedback in amplifiers. Show quantitatively the effect of negative feedback on (i) Gain (ii) Stability (iii) Noise (iv) Distortion.
 - b) Draw the circuit diagram of voltage series feedback amplifier and derive expressions for input and output resistances. [6+4]

OR

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- 7.a) Explain the concept of frequency and amplitude stability of oscillators.
b) Derive an expression for frequency oscillation of Hartley oscillator using transistor. [5+5]

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- 8.a) What is meant by distortion in power amplifiers? Discuss crossover distortion.
b) Show that the maximum conversion efficiency of a push-pull class-B power amplifier is 78.5%. [5+5]

OR

- 9.a) Derive the expression for the harmonic distortion in a power amplifier.
b) Draw and explain complementary symmetry class B push-pull amplifier. [5+5]

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- 10.a) Derive an expression for bandwidth of an n-stage synchronously tuned amplifier.
b) Draw the circuit of single tuned capacitance coupled amplifier and explain its operation. [5+5]

OR

- 11.a) Discuss the necessity of stabilization circuits in tuned amplifiers.
b) Draw the circuit of staggered tuned capacitance coupled amplifier and explain its operation. [4+6]

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